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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,506	11/13/2001	Brian T. Rosenberger	TA-00448	6463

35979 7590 12/05/2008

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EXAMINER	
AMARI, ALESSANDRO V	
ART UNIT	PAPER NUMBER
2872	

NOTIFICATION DATE	DELIVERY MODE
12/05/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@bgllp.com

Office Action Summary	Application No.	Applicant(s)	
	10/010,506	ROSENBERGER ET AL.	
	Examiner	Art Unit	
	ALESSANDRO AMARI	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 September 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3 and 7-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,7,9-25* is/are rejected.

7)☒ Claim(s) *8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3 and 10-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al US 4,340,617.

In regard to claims 1 and 12, Deutsch et al discloses (see Figure 1) an apparatus for forming a three-dimensional structure from a gaseous medium, comprising a processing chamber (14) containing the gaseous medium (18); and a holographic projector to project at least one hologram into the gaseous medium within the processing chamber as described in column 11, lines 31-40, wherein the hologram imparts energy to dissociate gas precursors within the gaseous medium causing dissociated gas precursors to deposit in a pattern corresponding to the at least one hologram to thereby form the three-dimensional structure as described in column 4, lines 55-68 and column 5, lines 1-34.

However, in regard to claims 1 and 12, Deutsch et al does not teach the processing chamber at a pressure of about 100 pounds per square inch. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the pressure in the processing chamber be at 100 psi, since it has been held

that discovering an optimum value of a result effective variable involves only routine skill in the art. One would have been motivated to have the pressure be at 100 psi so as to obtain a deposition rate which provides for different structural properties (e.g., greater strength) of the three-dimensional structure formed from the gaseous medium. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)

Regarding claim 3, Deutsch et al teach the invention as set forth above but does not teach a second holographic projector configured to project a second hologram into the gaseous medium to function with the at least one hologram. It would have been obvious to one having ordinary skill in the art at the time the invention was made to duplicate the holographic projector, since it has been held that a mere duplication of working parts of a device involves only routine skill in the art. One would have been motivated to duplicate the holographic projector for the purpose increased flexibility and control for producing three-dimensional structures of increasing complexity and variety. *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960)

Regarding claim 10, Deutsch et al discloses that the energy to dissociate gas precursors corresponds to a wavelength of electromagnetic energy used to project the at least one hologram as described in column 5, lines 5-24.

Regarding claim 11, Deutsch et al discloses that the energy to dissociate gas precursors corresponds to absorption bands of the gas precursors as described in column 5, lines 5-10.

Regarding claim 13, Deutsch et al discloses wherein an intensity of the at least one hologram is manipulated to manipulate a deposition rate of the dissociated gas precursors as described in column 5, lines 21-29.

Regarding claim 14, Deutsch et al discloses that the gaseous organometallic compounds allow metal to be deposited in the pattern corresponding to the at least one hologram as described in column 5, lines 5-20.

Regarding claim 15, Deutsch et al discloses (see Figure 1) that the at least one hologram is projected onto a stage (16) within the processing chamber.

Regarding claim 16, Deutsch et al discloses (see Fig. 3) that the stage is thermally biased as described in column 10, lines 50-54.

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al US 4,340,617 in view of Marcus US 5,017,317 and further in view of Amako et al US 5,497,254.

In regard to claim 7, Deutsch et al teaches (see Figure 1) an apparatus to deposit a three-dimensional structure comprising a holographic projector to project a series of holograms as described in column 11, lines 31-40, a gaseous delivery system (19) to deliver gas precursors; and a processing chamber (14) wherein the processing chamber further comprises a window (19a) wherein the window is transparent to the holograms as described in column 5, lines 38-39, a plane (16) on which the holograms are imaged; an inlet (see opening in chamber 14 from tube connected to gaseous delivery system 19) to receive the gas precursors from the gaseous delivery system wherein the gas precursors comprise varying gas components and wherein the hologram imparts energy

to dissociate the gas precursors causing dissociated gas precursors to deposit in the plane in a pattern corresponding to the hologram as described in column 4, lines 55-68 and column 5, lines 1-34.

However, in regard to claim 7, Deutsch et al does not teach an outlet to exhaust effluent from the processing chamber.

In regard to claim 7, Marcus teaches (see Fig. 1) an outlet (25) to exhaust effluent from the processing chamber.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the exhaust outlet as taught by Marcus in the apparatus of Deutsch et al in order to achieve better control of the deposition process in the chamber thus forming a more precise three dimensional structure.

However, in further regard to claim 7, Deutsch et al and Marcus et al do not teach a laser source supplying a laser beam directed via optics to a phase spatial light modulator.

Regarding claim 7, Amako et al teaches (see Fig. 24) that the holographic projector further comprises a phase plate (2404) illuminated by a laser source (2412) to generate the at least one hologram as described in column 16, lines 9-42.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the phase plate of Amako et al in the apparatus of Deutsch et al in view of Marcus et al in order to provide a programmable modulation optical device offering increased flexibility and control for producing three-dimensional structures of increasing complexity and variety.

4. Claims 9 and 18-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al US 4,340,617 in view of Maxwell et al US 5,786,023.

In regard to claim 9, Deutsch et al teaches (see Figure 1) a method for forming a three-dimensional solid structure, the method comprising injecting a gas medium into a chamber; projecting a first hologram of electromagnetic energy into the chamber as described in column 11, lines 31-40, the electromagnetic energy configured to impart energy to the gas medium that phase changes the gas into a three dimensional structure and as described in column 4, lines 55-68, column 5, lines 1-34 and column 8, lines 44-57.

However, in regard to claim 9, Deutsch et al does not teach influencing the gas phase change rate by controlling the chamber pressure.

In regard to claim 9, Maxwell et al teach influencing the gas phase change rate by controlling the chamber pressure as described column 5, lines 54-67, column 6, lines 1-67 and column 7, lines 1-42. Although the prior art does not specifically disclose that the influencing of the gas change rate by controlling the chamber pressure, this is seen as an inherent teaching of the apparatus since it is apparent that a change in pressure will affect the deposition process which is related to the gas phase change rate.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to influence the gas phase change rate by controlling the chamber pressure as taught by Maxwell et al for the method for forming a three-dimensional structure as taught by Deutsch et al in order to provide for formation of materials that have greater strength or other novel material properties.

Regarding claim 18, Deutsch et al teaches that the energy to dissociate gas precursors corresponds to a wavelength of electromagnetic energy used to project the first hologram and subsequent hologram as described in column 5, lines 5-24.

Regarding claim 19, Deutsch et al discloses that the energy to dissociate gas precursors corresponds to absorption bands of the gas precursors as described in column 5, lines 5-10.

Regarding claim 20, Deutsch et al teach the invention as set forth above but does not teach projecting a second hologram. It would have been obvious to one having ordinary skill in the art at the time the invention was made to duplicate the hologram, since it has been held that a mere duplication of working parts of a device involves only routine skill in the art. One would have been motivated to duplicate the hologram for the purpose increased flexibility and control for producing three-dimensional structures of increasing complexity and variety. *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960)

Regarding claim 21, Deutsch et al discloses that the hologram of electromagnetic energy is created with a laser source, the method further comprising varying the laser source energy to thereby correspondingly vary the density of the structure being formed as described in column 5, lines 21-29.

Regarding claim 22, Deutsch et al discloses that the gaseous organometallic compounds allow metal to be deposited in the pattern corresponding to the at least one hologram as described in column 5, lines 5-20.

Regarding claim 23, Deutsch et al discloses (see Figure 1) that the at least one hologram is projected onto a stage (16) within the processing chamber.

Regarding claim 24, Deutsch et al discloses (see Fig. 3) that the stage is thermally biased as described in column 10, lines 50-54.

5. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al US 4,340,617 in view of Amako et al US 5,497,254.

Regarding claim 17, Deutsch et al teaches the invention as set forth above but does not teach that the holographic projector further comprises a computer driven phase plate illuminated by a laser source to generate the at least one hologram.

Regarding claim 17, Amako et al teaches (see Fig. 24) that the holographic projector further comprises a computer driven phase plate (2404) illuminated by a laser source (2412) to generate the at least one hologram as described in column 16, lines 9-42.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the computer driven phase plate of Amako et al in the apparatus of Deutsch et al in order to provide a programmable modulation optical device offering increased flexibility and control for producing three-dimensional structures of increasing complexity and variety.

6. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al US 4,340,617 in view of Maxwell et al US 5,786,023 and further in view of Amako et al US 5,497,254.

Regarding claim 25, Deutsch et al in view of Maxwell et al teaches the invention as set forth above but does not teach that the holographic projector further comprises a computer driven phase plate illuminated by a laser source to generate the at least one hologram.

Regarding claim 25, Amako et al teaches (see Fig. 24) that the holographic projector further comprises a computer driven phase plate (2404) illuminated by a laser source (2412) to generate the at least one hologram as described in column 16, lines 9-42.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the computer driven phase plate of Amako et al in the apparatus of Deutsch et al in view of Maxwell et al in order to provide a programmable modulation optical device offering increased flexibility and control for producing three-dimensional structures of increasing complexity and variety.

Allowable Subject Matter

7. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claim 8 is allowable for at least the reason, “a laser light source to generate coherent collimated electromagnetic energy; a computer driven phase plate placed in a path of the coherent collimated electromagnetic energy to the hologram operable to generate holograms at varying wave lengths directed into the processing chamber to

deposit multiple definition compounds in the plane" as set forth in the claimed combination.

Response to Arguments

9. Applicant's arguments with respect to claims 1, 3, 7 and 9-25 have been considered but are moot in view of the new ground(s) of rejection. Further in regard to the rejection of claims 9, 12 and 18-24 (Deutsch et al '617 in view of Maxwell et al '203), the Applicant indicated that they were unable to locate a reference in Maxwell et al relating gas phase change rate to chamber pressure control. In response to this argument, the Examiner would like to point out that although the prior art does not specifically disclose that the influencing of the gas change rate by controlling the chamber pressure, this is seen as an inherent teaching of the apparatus since it is apparent that a change in pressure will affect the deposition process which is related to the gas phase change rate.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALESSANDRO AMARI whose telephone number is (571)272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on (571) 272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ava
25 November 2008

/Alessandro Amari/
Primary Examiner, Art Unit 2872